## REMARKS

Claims 1 and 4-9 remain pending after amendment.

### *Claim Amendments*

By this amendment, claims 2 and 3 are canceled and the limitations thereof added to claim 1. No new matter is added by this amendment.

### *Applicants' Invention*

Applicants' invention comprises a heat fusible conjugate fiber produced by high-speed melt spinning, *and after the spinning, a heat treatment or a crimp treatment but no drawing,* which comprises a first resin component having an orientation index of 40% or higher and a second resin component having a lower melting or softening point than the melting point of the first resin component and an orientation index of 25% or lower, the second resin component being present on at least part of the surface of the fiber in a lengthwise continuous configuration, *the fiber having a heat shrinkage of 1% or less at a temperature higher than the melting point or softening point of the second resin component by 10℃.*

The claimed invention is neither disclosed nor suggested by the cited prior art.

***Rejection under 35 USC 102(b)/103(a)***

Claims 1-2 and 4-9 stand rejected under 35 USC 102(b)/103(a) as being unpatentable over Furukawa et al '540. This rejection is respectfully traversed to the extent deemed to apply to the claims as amended.

In response, the limitations of claims 2 and 3 are added to claim 1. As claim 3 is not rejected over the cited prior art, the incorporation of the limitations of claim 3 into claim 1 overcomes this rejection.

The rejection is thus moot and should be withdrawn.

***Rejection under 35 USC 103(a)***

Claims 1-9 stand rejected under 35 USC 103(a) as being unpatentable over Furukawa et al '540 in view of Ishizawa et al '155. This rejection is respectfully traversed to the extent deemed to apply to the claims as amended.

Furukawa et al discloses a process for producing a highly bulky nonwoven fabric. The fiber used in the fabric is a bi-component fiber which contains a crystalline propylene polymer as a first component and an ethylene polymer as a second component. The fiber has a side-by-side or sheath-core configuration so that the second component can occupy at least a portion of the fiber surface continuously in the lengthwise direction of the fiber. The melting point of the first component is 20°C higher than that of the second component. The fiber is produced by melt-spinning to prepare an unstretched fiber, followed by preheating and stretching the unstretched fiber.

In other words, the fiber is not produced by high speed melt-spinning. The orientation index and heat shrinkage of the core-sheath type bi-component fibers disclosed in Furukawa et al are unknown.

The Examiner states at page 5 of the Action that the Furukawa et al reference "does not teach a process with low or no draw." The Ishizawa et al reference is relied upon to cure this deficiency, but for the reasons set forth below, the combination of references fails to teach or suggest the claimed invention.

Ishizawa et al discloses a melt-adhesive composite fiber containing a first component and a second component. The first component is a crystalline polypropylene. The second component is a polyethylene. The composite fiber has a side-by-side or sheath-core configuration so that the second component can occupy at least a portion of the fiber surface continuously in the lengthwise direction of the fiber. The melting point of the polyethylene is lower than that of the crystalline polypropylene by 20 °C or more. The composite fiber is produced by melt-spinning to prepare an unstretched fiber, followed by stretching the unstretched fiber at a temperature of higher than 90 °C, but lower than 130 °C, at a stretching ratio of 0.60 to 0.85 times the maximum stretching ratio. Again, the fiber is not produced by high speed melt-spinning. A nonwoven fabric which contains the composite fiber is evaluated in terms of fabric shrinkage. In the evaluation, the fabrics having a shrinkage of lower than 10% are regarded as acceptable. The orientation index and heat shrinkage of core-sheath type bi-component fibers disclosed in Ishizawa et al are unknown.

The main distinction between the claimed invention and the inventions disclosed in Furukawa et al and Ishizawa et al resides in that the fibers of the references do not satisfy an

orientation index of a first resin component of 40% or higher and that of a second resin component of 25% or lower as defined in the claimed invention.

In particular, even if Furukawa et al and Ishizawa et al use the same kind of resins of the claimed invention, i.e., a high density polyethylene and a polypropylene, the properties of the fibers produced from those resins can vary depending on the molecular weight and melt flow rate of the resins, and manufacturing condition of the fiber, etc. That is, although Furukawa et al and Ishizawa et al discloses the bi-component fiber composed of a combination of a high density polyethylene and a polypropylene, it cannot be said that the bi-component fiber satisfies the orientation index defined in the claimed invention.

Further, it cannot be merely presumed that the fibers of Furukawa et al and Ishizawa et al satisfy the orientation index defined in the claimed invention, in view of the fact that the manufacturing steps used to form the fibers of these references is totally different from that of the fiber of the claimed invention. That is, the fiber of the claimed invention is produced by ***high speed melt-spinning*** followed by a heat or a crimp treatment, but not followed by drawing. This production process is a unique process which results in the aforementioned orientation index limitation being achieved.

By contrast, the fibers disclosed in Furukawa et al and Ishizawa et al are merely fibers produced by conventional spinning under conventional conditions. Unlike the claimed invention, the production process of fibers disclosed in Furukawa et al and Ishizawa et al do *not* include a heat or a crimp treatment after high speed melt-spinning. As a consequence of the failure to carry out a heat treatment or a crimp treatment after high speed melt-spinning, the fibers disclosed in Furukawa et al and Ishizawa at al do not possess the orientation index of the claimed invention.

Further, the Examiner's reliance on the teaching of Ishizawa et al of the use of "a low stretching ratio" of 0.6 to 0.85 is inconsistent with applicants' claim limitation of "no drawing".

Furthermore, the claimed invention is different from the inventions disclosed in Furukawa at al and Ishizawa et al with regard to the heat shrinkage of fiber. The fiber of the claimed invention has a heat shrinkage of 1% or less, whereas Furukawa at al and Ishizawa et al are silent about the heat shrinkage of the fiber. As demonstrated at Example 2 of Table 1, or Example 5 of Table 3, of the present specification, the fibers of the claimed invention also contain fibers which have negative heat shrinkage – in other words, the fibers elongate their length by the application of heat. As a result of being produced under the aforementioned unique conditions, the fibers of the claimed invention exhibit a low heat shrinkage as well as the recited orientation index.

As such, it is clear that the fibers of the claimed invention are distinct from the fibers disclosed in Furukawa et al and Ishizawa et al. In connection with heat shrinkage, Ishizawa at al teaches that the *nonwoven fabric* has a shrinkage of 10% or less. However, Ishizawa at al is silent about *fiber* shrinkage. In Ishizawa et al, the web formed from a fiber as a raw material is subjected to heat, thereby producing a nonwoven fabric. The fiber in the web shrinks by the action of heat during the course of production.

Accordingly, even if additional heat is applied to the nonwoven fabric afterwards, the nonwoven fabric no longer shrinks, For that reason, it is quite natural that *the fabric* shrinkage is small in Ishizawa et al. However, it is the fiber shrinkage that is important in the claimed invention. Minimization of fiber shrinkage results in a smaller web shrinkage in the course of production, so that a nonwoven fabric having high bulkiness and high strength can be achieved.

Furukawa et al and Ishizawa et al accordingly neither disclose not suggest that a nonwoven fabric having high bulkiness and high strength can be obtained by using, as a raw material of nonwoven fabric, a thermally bondable fiber having the specific orientation index and heat shrinkage which are not taught by those references. It should be noted that the high bulkiness and high strength are inconsistent properties in the technical field of nonwoven fabric. Accordingly, the claimed invention is neither the same as those disclosed in Furukawa et al and Ishizawa et al, nor rendered obvious to a skilled person, absent the use of hindsight analysis.

Furthermore, the nonwoven fabric containing the thermally bondable bi-component fiber of the claimed invention has quite a high specific volume of 95 $cm^3/g$ or larger, which means the fiber becomes bulky. This advantage is achieved due to the use of the fiber of the present invention in a nonwoven fabric. Using, as a raw material, the thermally bondable bi-component fiber whose orientation index and heat shrinkage fall within the specific range, the claimed invention yields a bulky and high strength nonwoven fabric.

In summary, a bulky and high strength nonwoven fabric can be achieved in accordance with the present invention by the following:

(i) Suppressing the heat shrinkage of the fiber to 1% or less so that the fused region at the intersection of the fibers does not shift during thermal bonding, as a large degree of shrinkage causes the shift of fused region at the intersection of the fibers in the course of thermal banding which reduces the strength of the nonwoven fabric.

(ii) Employing a lower temperature (or less hot air) than a conventional heat treatment due to such a low orientation index of the second resin component of

25% or lower, so that reduction in bulkiness caused by air pressure can be restrained.

The fibers used in Furukawa et al and Ishizawa et al are similar to the bi-component fiber of the claimed invention only to the extent that the core is composed of a polypropylene and the sheath is composed of a high density polyethylene. Otherwise, all other material aspects of the respective inventions are distinct from each other. Consequently, the nonwoven fabrics disclosed in Furukawa et al and Ishizawa et al do not exhibit the same bulk as the claimed invention.

The rejection is accordingly without basis and should be withdrawn.

The application is believed to be in condition for allowance, and an early indication of same earnestly is solicited.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact John W. Bailey (Reg. No. 32,881 ) at the telephone number of the undersigned below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

Payment in the amount of $120.00 is submitted herewith as payment for the requested one month extension of time.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37.C.F.R. §§1.16 or 1.14; particularly, extension of time fees.

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Respectfully submitted,

By _____

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